Prüfbericht - Nr.: *Test Report No.:*	CN217HX9 001	**Auftrags-Nr.:** *Order No.:*	244329439	**Seite 1 von 23** *Page 1 of 23*

Kunden-Referenz-Nr.: *Client Reference No.:*	2089836
Auftragsdatum: *Order date:*	2021-05-06
Auftraggeber: *Client:*	**Pylon Technologies Co., Ltd.** No. 73, Lane 887, Zu Chongzhi Road, Zhangjiang Hi-Tech Park Pudong, Shanghai, 201203, P. R. China.
Prüfgegenstand: *Test item:*	LFP Lithium Ion Energy Storage System
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	PowerCube-M1-C-32/zzzV-L10 (zzz=32~864, in steps of 32) PowerCube-M1-C-32/zzzV-J10 (zzz=256~864, in steps of 32)
Auftrags-Inhalt: *Order content:*	TÜV mark approval
Prüfgrundlage: *Test specification:*	IEC 62619: 2017, IEC 63056: 2020
Wareneingangsdatum: *Date of receipt::*	2021-06-01
Prüfmuster-Nr.: *Test sample No.:*	A003058461-001
Prüfzeitraum: *Testing period:*	2021-06-18 to 2021-07-13
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shanghai) Co., Ltd.
Prüflaboratorium: *Testing Laboratory:*	TÜV Rheinland (Shanghai) Co., Ltd.
Prüfergebnis*: *Test Result*:*	Pass

geprüft/ *tested by:*

2021-09-27	Stone Wang/Engineer	Stone Wang
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

kontrolliert/ *reviewed by:*

2021-09-27	Bowen Dong/Weichun Li/Reviewer	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges/ *Other Aspects:*

- 1. This test report is issued for TÜV mark approval;
- 2. The complete test report includes the following documents: Attachment 1: IEC 63056 Test report (17 pages); Attachment 2: Photo documentation (16 pages); Attachment 3: Critical components information (6 pages).

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*
Prüfmuster vollständig und unbeschädigt
Test item complete and undamaged

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

V05

Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 62619
Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications

Report Number..... :	CN217HX9 001
Date of issue ..... :	See cover page
Total number of pages.....	See cover page
Name of Testing Laboratory preparing the Report ..... :	TÜV Rheinland (Shanghai) Co., Ltd.
Applicant's name..... :	Pylon Technologies Co., Ltd.
Address..... :	No. 73, Lane 887, Zu Chongzhi Road, Zhangjiang Hi-Tech Park Pudong, Shanghai, 201203, P. R. China.
Test specification:	
Standard..... :	IEC 62619: 2017
Test procedure..... :	TÜV mark approval
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62619A
Test Report Form(s) Originator.... :	UL(Demko)
Master TRF ..... :	Dated 2018-06-07

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description..... :	LFP Lithium Ion Energy Storage System
Trade Mark..... :	PYLONTECH
Manufacturer..... :	Same as applicant
Model/Type reference ..... :	See cover page
Ratings..... :	See copy of marking label and model list.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☐	**CB Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature).. :			
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature).. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Witnessed by (name, function, signature). :			
Approved by (name, function, signature).. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature). :			
Approved by (name, function, signature).. :			
Supervised by (name, function, signature):			

List of Attachments (including a total number of pages in each attachment):
Attachment 1: IEC 63056 report (17 pages).
Attachment 2: Photo documentation (16 pages).
Attachment 3: Critical components information (6 pages).

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.7.2.3.3 Edge and corner drop test (battery system); cl.8.2.2 Overcharge control of voltage (battery system) cl.8.2.3 Overcharge control of current (battery system) cl.8.2.4 Overheating control (battery system) The samples comply with the requirement of IEC 62619: 2017.	TÜV Rheinland (Shanghai) Co., Ltd. No. 177, Lane 777, West Guangzhong Road, Jing'an District, Shanghai 200072, P. R. China

Summary of compliance with National Differences (List of countries addressed):

N/A

☒ **The product fulfils the requirement of EN 62619:2017**

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

For external power supply:

PYLONTECH

Name	LFP Lithium Ion Energy Storage System				
BatteryType	LiFePO4（LFP）				
Module Quantity /Type No. * /Nominal Voltage /Charge Voltage /Maximum Energy /System designation	☐ 1	PowerCube-M1-C-32/32V-L10	35~36V	4.736kWh	LFpP/13/141/238[((4P5S)2S)1S]M/0+50/95
	☐ 2	PowerCube-M1-C-32/64V-L10	70~72V	9.472kWh	LFpP/13/141/238[((4P5S)2S)2S]M/0+50/95
	☐ 3	PowerCube-M1-C-32/96V-L10	105~108V	14.208kWh	LFpP/13/141/238[((4P5S)2S)3S]M/0+50/95
	☐ 4	PowerCube-M1-C-32/128V-L10	140~144V	18.944kWh	LFpP/13/141/238[((4P5S)2S)4S]M/0+50/95
	☐ 5	PowerCube-M1-C-32/160V-L10	175~180V	23.68kWh	LFpP/13/141/238[((4P5S)2S)5S]M/0+50/95
	☐ 6	PowerCube-M1-C-32/192V-L10	210~216V	28.416kWh	LFpP/13/141/238[((4P5S)2S)6S]M/0+50/95
	☐ 7	PowerCube-M1-C-32/224V-L10	245~252V	33.152kWh	LFpP/13/141/238[((4P5S)2S)7S]M/0+50/95
Capacity	148Ah		Nominal/Maximum Current		74/148A
OverCurrent/Duration	8000A, 2ms		IP Rating/ Protection Class		IP20 / I
Operating Temperature:	10-40℃		Storage Temperature:		-20℃~60℃
Note: Type identification: PowerCube-M1-C-32/zzzV(zzz=32~864, in steps of 32), zzzV is the Nominal Voltage					

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Pylon Technologies Co., Ltd. | www.pylontech.com.cn

Add: No.73, Lane 887, Zu Chongzhi Road, Shanghai,201203,China

CE UK CA

PYLONTECH

Name	LFP Lithium Ion Energy Storage System				
BatteryType	LiFePO4（LFP）				
Module Quantity /Type No. * /Nominal Voltage /Charge Voltage /Maximum Energy /System designation	☐ 8	PowerCube-M1-C-32/256V-L10	280~288V	37.888kWh	LFpP/13/141/238[((4P5S)2S)8S]M/0+50/95
	☐ 9	PowerCube-M1-C-32/288V-L10	315~324V	42.624kWh	LFpP/13/141/238[((4P5S)2S)9S]M/0+50/95
	☐10	PowerCube-M1-C-32/320V-L10	350~360V	47.36kWh	LFpP/13/141/238[((4P5S)2S)10S]M/0+50/95
	☐11	PowerCube-M1-C-32/352V-L10	385~396V	52.096kWh	LFpP/13/141/238[((4P5S)2S)11S]M/0+50/95
	☐12	PowerCube-M1-C-32/384V-L10	420~432V	56.832kWh	LFpP/13/141/238[((4P5S)2S)12S]M/0+50/95
	☐13	PowerCube-M1-C-32/416V-L10	455~468V	61.568kWh	LFpP/13/141/238[((4P5S)2S)13S]M/0+50/95
	☐14	PowerCube-M1-C-32/448V-L10	490~504V	66.304kWh	LFpP/13/141/238[((4P5S)2S)14S]M/0+50/95
	☐15	PowerCube-M1-C-32/480V-L10	525~540V	71.04kWh	LFpP/13/141/238[((4P5S)2S)15S]M/0+50/95
	☐16	PowerCube-M1-C-32/512V-L10	560~576V	75.776kWh	LFpP/13/141/238[((4P5S)2S)16S]M/0+50/95
	☐17	PowerCube-M1-C-32/544V-L10	595~612V	80.512kWh	LFpP/13/141/238[((4P5S)2S)17S]M/0+50/95
Capacity	148Ah		Nominal/Maximum Current		74/148A
OverCurrent/Duration	8000A, 2ms		IP Rating/ Protection Class		IP20 / I
Operating Temperature:	10-40℃		Storage Temperature:		-20℃~60℃
Note: Type identification: PowerCube-M1-C-32/zzzV(zzz=32~864, in steps of 32), zzzV is the Nominal Voltage					

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Pylon Technologies Co., Ltd. | www.pylontech.com.cn

Add: No.73, Lane 887, Zu Chongzhi Road, Shanghai,201203,China

CE UK CA

PYLONTECH

Name	LFP Lithium Ion Energy Storage System				
BatteryType	LiFePQ4（LFP）				
Module Quantity /Type No. * /Nominal Voltage /Charge Voltage /Maximum Energy /System designation	□18	PowerCube-M1-C-32/576V-L10	630~648V	85.248kWh	LFpP/13/141/238[((4P5S)2S)18S]M/0+50/95
	□19	PowerCube-M1-C-32/608V-L10	665~684V	89.984kWh	LFpP/13/141/238[((4P5S)2S)19S]M/0+50/95
	□20	PowerCube-M1-C-32/640V-L10	700~720V	94.72kWh	LFpP/13/141/238[((4P5S)2S)20S]M/0+50/95
	□21	PowerCube-M1-C-32/672V-L10	735~756V	99.456kWh	LFpP/13/141/238[((4P5S)2S)21S]M/0+50/95
	□22	PowerCube-M1-C-32/704V-L10	770~792V	104.192kWh	LFpP/13/141/238[((4P5S)2S)22S]M/0+50/95
	□23	PowerCube-M1-C-32/736V-L10	805~828V	108.928kWh	LFpP/13/141/238[((4P5S)2S)23S]M/0+50/95
	□24	PowerCube-M1-C-32/768V-L10	840~864V	113.664kWh	LFpP/13/141/238[((4P5S)2S)24S]M/0+50/95
	□25	PowerCube-M1-C-32/800V-L10	875~900V	118.4kWh	LFpP/13/141/238[((4P5S)2S)25S]M/0+50/95
	□26	PowerCube-M1-C-32/832V-L10	910~936V	123.136kWh	LFpP/13/141/238[((4P5S)2S)26S]M/0+50/95
	□27	PowerCube-M1-C-32/864V-L10	945~972V	127.872kWh	LFpP/13/141/238[((4P5S)2S)27S]M/0+50/95
Capacity	148Ah		Nominal/Maximum Current		74/148A
OverCurrent/Duration	8000A, 2ms		IP Rating/ Protection Class		IP20 / I
Operating Temperature:	10-40℃		Storage Temperature:		-20℃~60℃
Note: Type identification: PowerCube-M1-C-32/zzzV(zzz=32~864, in steps of 32), zzzV is the Nominal Voltage					

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Pylon Technologies Co., Ltd. | www.pylontech.com.cn
Add: No.73, Lane 887, Zu Chongzhi Road, Shanghai,201203,China

For internal power supply:

PYLONTECH

Name	LFP Lithium Ion Energy Storage System				
BatteryType	LiFePQ4（LFP）				
Module Quantity /Type No. * /Nominal Voltage /Charge Voltage /Maximum Energy /System designation	□ 8	PowerCube-M1-C-32/256V-J10	280~288V	37.888kWh	LFpP/13/141/238[((4P5S)2S)8S]M/0+50/95
	□ 9	PowerCube-M1-C-32/288V-J10	315~324V	42.624kWh	LFpP/13/141/238[((4P5S)2S)9S]M/0+50/95
	□10	PowerCube-M1-C-32/320V-J10	350~360V	47.36kWh	LFpP/13/141/238[((4P5S)2S)10S]M/0+50/95
	□11	PowerCube-M1-C-32/352V-J10	385~396V	52.096kWh	LFpP/13/141/238[((4P5S)2S)11S]M/0+50/95
	□12	PowerCube-M1-C-32/384V-J10	420~432V	56.832kWh	LFpP/13/141/238[((4P5S)2S)12S]M/0+50/95
	□13	PowerCube-M1-C-32/416V-J10	455~468V	61.568kWh	LFpP/13/141/238[((4P5S)2S)13S]M/0+50/95
	□14	PowerCube-M1-C-32/448V-J10	490~504V	66.304kWh	LFpP/13/141/238[((4P5S)2S)14S]M/0+50/95
	□15	PowerCube-M1-C-32/480V-J10	525~540V	71.04kWh	LFpP/13/141/238[((4P5S)2S)15S]M/0+50/95
	□16	PowerCube-M1-C-32/512V-J10	560~576V	75.776kWh	LFpP/13/141/238[((4P5S)2S)16S]M/0+50/95
	□17	PowerCube-M1-C-32/544V-J10	595~612V	80.512kWh	LFpP/13/141/238[((4P5S)2S)17S]M/0+50/95
Capacity	148Ah		Nominal/Maximum Current		74/148A
OverCurrent/Duration	8000A, 2ms		IP Rating/ Protection Class		IP20 / I
Operating Temperature:	10-40℃		Storage Temperature:		-20℃~60℃
Note: Type identification: PowerCube-M1-C-32/zzzV(zzz=32~864, in steps of 32), zzzV is the Nominal Voltage					

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Pylon Technologies Co., Ltd. | www.pylontech.com.cn
Add: No.73, Lane 887, Zu Chongzhi Road, Shanghai,201203,China

PYLONTECH

Name	LFP Lithium Ion Energy Storage System				
BatteryType	LiFePQ4（LFP）				
Module Quantity /Type No. * /Nominal Voltage /Charge Voltage /Maximum Energy /System designation	□18	PowerCube-M1-C-32/576V-J10	630~648V	85.248kWh	LFpP/13/141/238[((4P5S)2S)18S]M/0+50/95
	□19	PowerCube-M1-C-32/608V-J10	665~684V	89.984kWh	LFpP/13/141/238[((4P5S)2S)19S]M/0+50/95
	□20	PowerCube-M1-C-32/640V-J10	700~720V	94.72kWh	LFpP/13/141/238[((4P5S)2S)20S]M/0+50/95
	□21	PowerCube-M1-C-32/672V-J10	735~756V	99.456kWh	LFpP/13/141/238[((4P5S)2S)21S]M/0+50/95
	□22	PowerCube-M1-C-32/704V-J10	770~792V	104.192kWh	LFpP/13/141/238[((4P5S)2S)22S]M/0+50/95
	□23	PowerCube-M1-C-32/736V-J10	805~828V	108.928kWh	LFpP/13/141/238[((4P5S)2S)23S]M/0+50/95
	□24	PowerCube-M1-C-32/768V-J10	840~864V	113.664kWh	LFpP/13/141/238[((4P5S)2S)24S]M/0+50/95
	□25	PowerCube-M1-C-32/800V-J10	875~900V	118.4kWh	LFpP/13/141/238[((4P5S)2S)25S]M/0+50/95
	□26	PowerCube-M1-C-32/832V-J10	910~936V	123.136kWh	LFpP/13/141/238[((4P5S)2S)26S]M/0+50/95
	□27	PowerCube-M1-C-32/864V-J10	945~972V	127.872kWh	LFpP/13/141/238[((4P5S)2S)27S]M/0+50/95
Capacity	148Ah		Nominal/Maximum Current		74/148A
OverCurrent/Duration	8000A, 2ms		IP Rating/ Protection Class		IP20 / I
Operating Temperature:	10-40℃		Storage Temperature:		-20℃~60℃
Note: Type identification: PowerCube-M1-C-32/zzzV(zzz=32~864, in steps of 32), zzzV is the Nominal Voltage					

SN:

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Pylon Technologies Co., Ltd. | www.pylontech.com.cn
Add: No.73, Lane 887, Zu Chongzhi Road, Shanghai,201203,China

Identifying for SN code:

SN：total 16 characters

The 1st-2nd indicates battery manfacture information; 3: Product type; 4: Product version; 5-7: Hardware version; 8-9: Software version; 10-11: Manfacture date; 12-13 Order information; 14-16: Production line serial number

Test item particulars.....:	
Classification of installation and use.....:	To be defined in final product
Supply Connection.....:	Not directly connected to mains
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item.....:	See cover page
Date (s) of performance of tests.....:	See cover page

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ **Yes** ☒ **Not applicable**

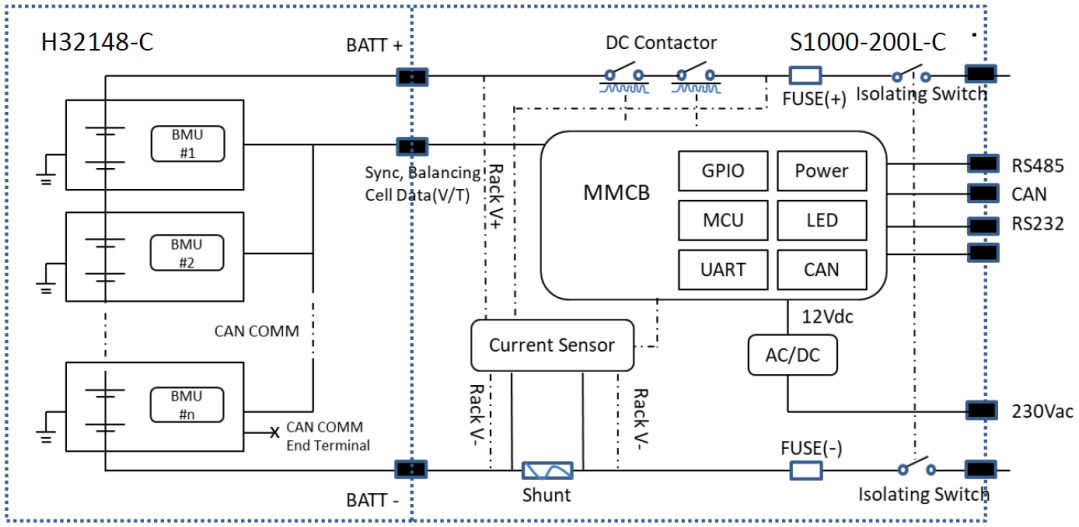
When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....:	Pylon Technologies Co., Ltd. Plant 8, No.505 Kunkai Road, JinXi Town, Kunshan City, Jiangsu Province, PEOPLE'S REPUBLICA OF CHINA

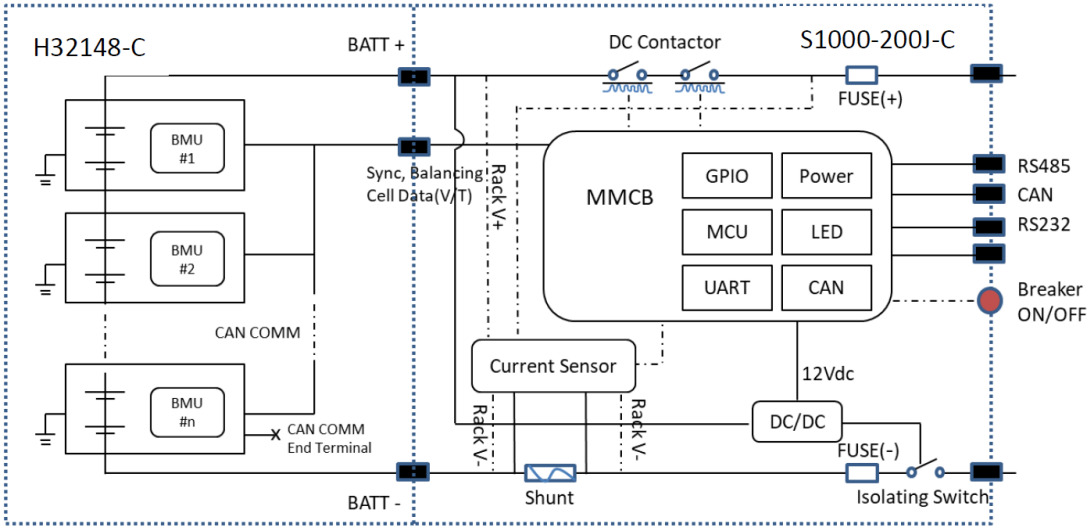
General product information and other remarks:

The EUTs covered by this report are energy storage systems which include one control module SC1000-200L-C and n (where n = 1~27) battery modules H32148-C in series connection or include one control module SC1000-200J-C and n (where n = 8~27) battery modules H32148-C in series connection.
The battery module is constructed with 2 small modules in series which are connected in the style that five cell blocks in series (4P5S) for each small module, and has overcharge, over-discharge, over current, over temperature and short-circuits proof circuit.
The battery module H32148-C use cell PF37M in (4P5S)2S, manufactured by Pylon Battery Co., Limited which is certified according to IEC 62619:2017.
The control module is supplied by the AC circuit or energy storage system, and gets the information of cell voltage and temperature through the communication port. The electronic circuits and software controls for the battery system replied upon as the primary master BMU safety protection, which have been evaluated in accordance with IEC 60730-1 Annex H.
The EUTs are built-in type, and are only used in the restricted access area. The insulation between the DC circuit and the metal enclosure is basic insulation. And the insulation between the DC circuit and communication ports is reinforced insulation or double insulation.
The manual disconnect device for both battery circuit and AC power supply circuit shall be provided externally.
The system diagram block is as below: the control module is supplied by different power style for two.

For S1000-200L-C



For S1000-200J-C



The main features of the cell and one battery system are shown as below:

Cell designation:

Identification / Type No.	PF37M
Cell designation	IFpP/13/141/238/M/-10+60/95
Capacity	37Ah
Nominal voltage	3.2V
Maximum charge current	74A
Maximum Discharge current	111A
Upper Limit Charge Voltage	3.8V
Discharge Cut-off Voltage	2.5V
Charge temperature range	-11°C~62°C
Discharge temperature range	-20°C~62°C
Recommend charging method declared by the manufacturer	At constant current 7.4A till cell voltage reaches 3.65V, then switch to constant voltage 3.65V till charge current drops to 0.74A
Charging procedure for internal short-circuit test	At constant current 74A till cell voltage reaches 3.65V, then switch to constant voltage 3.65V till charge current drops to 1.85A
Recommend discharging method declared by the manufacturer	Discharging the cell with 18.5A constant current to discharge cut-off voltage 2.5V
Nominal mass:	Approx. 790g
External dimensions:	12.2±0.3 mm *141±2.0 mm *240±2.0 mm L*W*H(mm) without terminal

Battery module:

Identification / Type No.	H321248-C
Battery designation	IFpP/13/141/238/[((4P5S)2S)]M/0+50/95
Rated capacity	148Ah
Nominal voltage	32Vd.c.
Upper limit charging voltage	36.5Vd.c.
Final voltage / End-of-discharge voltage	27Vd.c.
Recommend charging method declared by the manufacturer	At constant current 74A till cell voltage reaches 36V, then switch to constant voltage 36V till charge current drops to 7.4A
Recommend discharging method declared by the manufacturer	Discharging the cell with 74A constant current to discharge cut-off voltage 27V
Maximum current of the recommended charger	180A
Operating temperature	-10 to 60°C
Nominal mass	43kg

External dimensions	330mm(D)×628mm(W)×150.5mm(H)

Battery System designation:

Product name	LFP Lithium Ion Energy Storage System	
Identification / Type No.	PowerCube-M1-C-32/zzzV-L10 (zzz=32~864, in steps of 32)	PowerCube-M1-C-32/zzzV-J10 (zzz=256~864, in steps of 32)
Battery controller	S1000-200L-C	S1000-200J-C
Manufacturer	Pylon Technologies Co., Ltd.	
Production Factory	Pylon Technologies Co., Ltd.	
System designation	IFpP/13/141/238/[(((4P)5S)2S)nS]M/0+55/95 (where n = 1~27)	
Rated capacity	148Ah	
Nominal voltage	32V × n (where n = 1~27)	32V × n (where n = 8~27)
Nominal charging voltage	36V × n (where n = 1~27)	36V × n (where n = 8~27)
Final voltage / End-of-discharge voltage	27V× n (where n = 1~27)	27V× n (where n = 8~27)
Recommend charging method declared by the manufacturer	At constant current 74A till voltage reaches 36V× n (where n = 1~27), then switch to constant voltage 36V× n (where n = 1~27), till charge current drops to 7.4A	At constant current 74A till voltage reaches 36V× n (where n = 8~27), then switch to constant voltage 36V× n (where n = 8~27), till charge current drops to 7.4A
Recommend discharging method declared by the manufacturer	Discharging with 74A constant current to discharge cut-off voltage 27V× n (where n = 1~27)	Discharging with 74A constant current to discharge cut-off voltage 27V× n (where n = 8~27)
Supply for controller	230Va.c./50Hz/1.5A	-
Nominal Current	29.6A	
Recommend Current	74A	
Maximum charging current	180A	
Maximum discharging current	180A	
Upper limit charging voltage	36V× n (where n = 1~27)	36V× n (where n = 8~27)
Operating temperature	Charging: -8 to 60°C, Discharging: -10 to 60°C	
Wh rating	4.736kWh × n (where n = 1~27)	4.736kWh × n (where n = 8~27)
Overcharge protected voltage supply by battery system	≥3.65V/Cell	
Temperature threshold for	61 °C	

protection	
IP rating	IP20
Protective Class	I
Pollution degree (PD)	II
Cooling type	Natural cooling
Altitude [m]	4000m
External dimensions	815mm(W)*659mm(D)*2130mm(H) (Rack for n = 1~23) 815mm(W)*659mm(D)*2300mm(H) (Rack for n = 1~25) (n > 25, add a Rack)
Weight	Single Rack: 114+ 43xn (where n = 1~25) kg Double Rack：215+ 43xn (where n = 26~27) kg

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		**P**
	Parameter measurement tolerances		P
5	**GENERAL SAFETY CONSIDERATIONS**		**P**
5.1	**General**		**P**
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse. :	See attachment Constructional Data Form for details	P
5.2	**Insulation and wiring**		**P**
	Voltage, current, altitude, and humidity requirements		P
	Adequate clearances and creepage distances between connectors		P
	The mechanical integrity of internal connections		P
5.3	**Venting**		**N/A**
	Pressure relief function	No pressure relief function	N/A
	Encapsulation used to support cells within an outer casing		N/A
5.4	**Temperature/voltage/current management**		**P**
	The design prevents abnormal temperature-rise	Overcharge, over current and overheating proof circuit used in this battery. See tests of clause 8.	P
	Voltage, current, and temperature limits of the cells		P
	Specifications and charging instructions for equipment manufacturers	The charging limits specified in the user manual.	P
5.5	**Terminal contacts of the battery pack and/or battery system**		**P**
	Polarity marking(s)		P
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	**Assembly of cells, modules, or battery packs into battery systems**		P
5.6.1	General		P
	Independent control and protection method(s)	Battery system has independent control and protective functions, and BMS is integrated into battery system.	P
	Recommendations of cell operating limits by the cell manufacturer		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Batteries designed for the selective discharge of a portion of their series connected cells		N/A
	Protective circuit component(s) and consideration to the end-device application		P
5.6.2	Battery system design		P
	The voltage control function		P
	The voltage control for series-connected batteries		P
5.7	**Operating region of lithium cells and battery systems for safe use**		**P**
	The cell operating region ..... :		P
	Designation of battery system to comply with the cell operating region	Information mentioned in manufacturer's specifications.	P
5.8	**Quality plan**		**P**
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	ISO 9001:2015 certification provided.	P
	The process capabilities and the process controls		P
6	**TYPE TEST CONDITIONS**		**P**
6.1	**General**		**P**
6.2	**Test items**		**P**
	Cells or batteries that are not more than six months old (See Table 1 of IEC62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C	Tests were carried out in an ambient temperature of 25±5°C.	P
7	**SPECIFIC REQUIREMENTS AND TESTS**		**P**
7.1	**Charging procedure for test purposes**		**P**
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer..... :	The method mentioned in manufacturer's specifications.	P
7.2	**Reasonably foreseeable misuse**		**P**
7.2.1	External short-circuit test (cell or cell block)	Approval cell used.	N/A
	Short circuit with total resistance of 30 mΩ ± 10 mΩ at 25 °C ± 5 °C		N/A
	Results: no fire, no explosion		N/A
7.2.2	Impact test (cell or cell block)	Approval cell used.	N/A
	Cylindrical cell, longitudinal axis impact		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Prismatic cell, longitudinal axis and lateral axis impact		N/A
	Results: no fire, no explosion.		N/A
7.2.3	Drop test (cell or cell block, and battery system)		P
7.2.3.1	General		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)	Approval cell used.	N/A
	Description of the Test Unit..... :		—
	Mass of the test unit (kg)..... :		—
	Height of drop (m)..... :		—
	Results: no fire, no explosion		N/A
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)		P
	Description of the Test Unit..... :	Battery	—
	Mass of the test unit (kg)..... :	43kg	—
	Height of drop (m)..... :	10cm	—
	Results: no fire, no explosion	No fire, no explosion.	P
7.2.4	Thermal abuse test (cell or cell block)	Approval cell used.	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	Approval cell used.	N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion..... :		N/A
7.2.6	Forced discharge test (cell or cell block)	Approval cell used.	N/A
	Upper limit charge voltage of the cell..... :		N/A
	Cells connected in series in the battery system.... :		N/A
	Redundant or single protection for discharge voltage control provided in battery system..... :		N/A
	Target Voltage..... :		N/A
	Maximum discharge current of the cell, I_m..... :		N/A
	Discharge current for forced discharge, 1.0 It..... :		N/A
	Discharging time, t = (1 It / I_m) x 90 (min.)..... :		N/A
	Results: no fire, no explosion..... :		N/A
7.3	**Considerations for internal short-circuit – Design evaluation**		**N/A**
7.3.1	General	Approval cell used.	N/A
7.3.2	Internal short-circuit test (cell)		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Samples preparation procedure: a), in accordance with 8.3.9 of IEC62133:2012; or b), the nickel particle inserted before charging, or c), the nickel particle was inserted before electrolyte filling..... :		N/A
	Tested according to Cl. 8.3.9 of IEC 62133:2012 test method, except all tests were carried out in an ambient temperature of 25 °C ± 5 °C.		N/A
	The appearance of the short-circuit location recorded by photograph or other means ..... :		—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		N/A
	Results: no fire, no explosion..... :		N/A
7.3.3	**Propagation test (battery system)**	7.3.2 tested for cell	N/A
	Method to create a thermal runaway in one cell ... :		N/A
	Results: No external fire from the battery system or no battery case rupture ..... :		N/A

8	**BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)**		**P**
8.1	**General requirements**		**P**
	Functional safety analysis for critical controls	Functional safety evaluated acc. to IEC 60730-1 Annex H	P
	Conduct of a process hazard, risk assessment and mitigation of the battery system	See above.	P
8.2	**Battery management system (or battery management unit)**		**P**
8.2.1	Requirements for the BMS		P
	The safety integrity level (SIL) target of the BMS		N/A
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		P
8.2.2	Overcharge control of voltage (battery system)		P
	The exceeded charging voltage applied to the whole battery system	40.15V applied	P
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s)..... :		N/A
	Results: no fire, no explosion..... :	See Table 8.2.2.	P
	The BMS interrupted the overcharging before reaching 110% of the upper limit charging voltage		P
8.2.3	Overcharge control of current (battery system)		P
	Results: no fire, no explosion..... :	See Table 8.2.3	P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The BMS detected the overcharging current and controlled the charging to a level below the maximum charging current	216A applied	P
8.2.4	Overheating control (battery system)		P
	The cooling system, if provided, was disconnected		N/A
	Elevated temperature for charging, 5 °C above maximum operating temperature..... :		P
	Results: no fire, no explosion..... :	See Table 8.2.4	P
	The BMS detected the overheat temperature and terminated charging		P
	The battery system operated as designed during test		P
9	**INFORMATION FOR SAFETY**		**P**
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.		P
10	**MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)**		**P**
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.	See page 5	P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation	lFpP/13/141/238/[((4P5S)2S)nS]M/0+50/95	P
	Battery structure formulation	((4P5S)2S)nS	P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A	**OPERATING REGION OF CELLS FOR SAFE USE**		**P**
A.1	General		P
A.2	Charging conditions for safe use		P
A.3	Consideration on charging voltage		P
A.4	Consideration on temperature		P
A.5	High temperature range		P
A.6	Low temperature range		P
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P

ANNEX B	**PROCEDURE OF 7.3.3 PROPAGATION TEST**		**N/A**
B.1	General		N/A
B.2	Test conditions:		N/A
	– The battery fully charged according to the manufacturer recommended conditions…… :		N/A
	– Target cell forced into thermal runaway…… :		N/A
	– A specially prepared sample (e.g. a heater or a hole for nail penetration provided) used for ease of testing…… :		N/A
B.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods…… :		N/A

ANNEX C	**PACKAGING**		**P**
	The materials and pack design chosen in such a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: External short-circuit test (cell or cell block)				N/A
Sample No.	**Ambient (at 25°C ± 5°C)**	**OCV at start of test (V dc)**	**Resistance of Circuit (mΩ)**	**Maximum Case Temperature Rise ΔT (°C)**	**Results**

Supplementary information:
A - No fire or Explosion
B - Fire
C - Explosion
D - The test was completed after 6 h
E - The test was completed after the cell casing cooled to 20% of the maximum temperature rise
F - Other (Please explain):___

7.2.5	TABLE: Overcharge test (cell or cell block)					N/A
Sample No.	**OCV at start of test (V dc)**	**OCV at end of test (V dc)**	**Measured Maximum Charging Current (A)**	**Measured Maximum Charging Voltage (V dc)**	**Max. Cell Case Temperature, (°C)**	**Results**

Supplementary information:
Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Test concluded when temperature reached a steady state condition
E - Test concluded when temperature returned to ambient
F - Other (Please explain): _____

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.6	TABLE: Forced discharge test (cell or cell block)				N/A
Sample No.	**OCV before applying reverse charge, (V dc)**	**Target Voltage (V dc)**	**Measured Reverse Charge Current It, (A)**	**Total Time for Reversed Charge Application (min)**	**Results**

Supplementary information:

Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Other (Please explain): ___

7.3.2	TABLE: Internal short-circuit test (cell)			N/A
Sample No.	**OCV at start of test, (V dc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Results**

Supplementary information:

[1)] Identify one of the following**:**
1: Nickel particle inserted between positive and negative (active material) coated area.
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

Results:

A - No fire or explosion
B - Fire
C - Explosion
D - Test concluded when 50 mV voltage drop occurred prior to reaching force limit
E - Test concluded when 800/400 N pressure was reached and 50 mV voltage drop was not achieved
F - Test was concluded when fire or explosion occurred
G - Other (Please explain): __

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.3	TABLE: Propagation test (battery system)				N/A
Sample No.	**OCV of Battery System Before Test, (V dc)**	**OCV of Target Cell Before Test, (V dc)**	**Maximum Cell Case Temperature, (°C)**	**Maximum DUT Enclosure Temperature, (°C)**	**Results**

Method of cell failure [1)]	Location of target cell	Area for fire protection (m^2)

Supplementary information:

1) Cell can be failed through applied heat, overcharge, nail penetration or combinations of these failures or other acceptable methods. See supporting documentation for details on cell failure method

2) If the battery system has no outer covering, the manufacturer is required to specify the area for fire protection.

Results:
A - No fire external to DUT enclosure or area for fire protection or no battery case rupture
B - Fire external to DUT enclosure or area for fire protection
C - Explosion
D - Battery case rupture
E - Other (Please explain): __

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.2	TABLE: Overcharge control of voltage (battery system)				P
Sample No.	**OCV at start of test for Cell/Cell Blocks, (V dc)**	**Maximum Charging Current, (A)**	**Max. Charging Voltage, (V dc)**	**Max. Voltage of Cell/Cell Blocks, (V dc)**	**Results**
Battery 1	3.010 to 3.043	179.0	36.0	3.663	A, D, F
--	--	--	--	--	--
--	--	--	--	--	--

	Charge Voltage Applied Battery System: 1)	
	Whole	**Part**
	39.6V	N/A

Supplementary information:

1. The exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system per Figure 6 of IEC 62619, if it is difficult to do it in using the whole battery system.

Results:
A - No Fire or Explosion
B - Fire
C - Explosion
D - The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage
E - The voltage of the measured cells or cell blocks did exceed the upper limit charging voltage
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ___

8.2.3	TABLE: Overcharge control of current (battery system)				P
Sample No.	**OCV at start of test, (V dc)**	**Max. Charging Current, (A)**	**Max. Charging Voltage, (V dc)**	**Results**	
Battery 1	28.126	215.980	36.0	A, D, F	
--	--	--	--	--	
--	--	--	--	--	

Supplementary information:

Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Overcurrent sensing function of BMU did operate and then charging stopped
E - Overcurrent sensing function of BMU did not operate and then charging stopped
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ___

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.4	TABLE: Overheating control (battery system)		P
Model No.	**OCV at start(SOC 50%) of test, V dc**	**Maximum Charging Current, A**	**Maximum Charging Voltage, V dc**
Battery 1	33.906	179.9	36.0
--	--	--	--
--	--	--	--
Maximum Specified Temperature of Battery System, °C		**Maximum Measured Cell Case Temperature, °C**	**Results**
61.0		61.2	A, D, F
--		--	--
--		--	--

Supplementary information:

Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Temperature sensing function of BMU did operate and then charging stopped
E - Temperature sensing function of BMU did not operate and then charging stopped
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ____

- End of test report -

Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 63056
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries for use in electrical energy storage systems

Report Number..... :	**CN21FL8O 001**
Date of issue ..... :	**See cover page**
Total number of pages..... :	**See cover page**
Name of Testing Laboratory preparing the Report ..... :	**TÜV Rheinland (Shanghai) Co., Ltd.** B1-13F, No. 177, Lane 777, West Guangzhong Road, Jingan District, Shanghai 200072, P. R. China
Applicant's name..... :	Pylon Technologies Co., Ltd.
Address..... :	No. 73, Lane 887, Zu Chongzhi Road, Zhangjiang Hi-Tech Park Pudong, Shanghai, 201203, P. R. China.
Test specification:	
Standard..... :	IEC 63056: 2020
Test procedure..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC63056A
Test Report Form(s) Originator.... :	TUV Rheinland
Master TRF ..... :	Dated 2020-05-08

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description.....:	LFP Lithium Ion Energy Storage System
Trade Mark(s).....:	PYLONTECH
Manufacturer.....:	Pylon Technologies Co., Ltd
Model/Type reference.....:	PowerCube-M1-C-32/zzzV-L10 (zzz=32~864, in steps of 32) PowerCube-M1-C-32/zzzV-J10 (zzz=256~864, in steps of 32)
Ratings.....:	See copy of marking label and model list.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☐	**CB Testing Laboratory:**		
Testing location/ address .....:			
Tested by (name, function, signature) .....:			
Approved by (name, function, signature)..:			
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address .....:			
Tested by (name, function, signature) .....:			
Approved by (name, function, signature)..:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address .....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature).:			
Approved by (name, function, signature)..:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address .....:			
Tested by (name, function, signature) .....:			
Witnessed by (name, function, signature).:			
Approved by (name, function, signature)..:			
Supervised by (name, function, signature):			

List of Attachments (including a total number of pages in each attachment):
-N/A

Summary of testing:

Tests performed (name of test and test clause):

Clause(s)	Test(s)
7.4	Electric insulation check during transport and installation
7.6	Protection against short circuit during transport and installation
7.7	Protection for reverse connection
7.8	Overdischarge control of voltage (battery system)
7.9	Drop test

These tests are outside the scope of this CNAS.

Testing location:

SRF testing and certification (Changzhou) Co., LTD.

No.27 Chuangzhi Road, Kunlun Street, Liyang City, Jiangsu.

Summary of compliance with National Differences (List of countries addressed):

N/A

☐ **The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)**

Statement concerning the uncertainty of the measurement systems used for the tests
(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**
Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☐ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

See report CN217HX9 001.

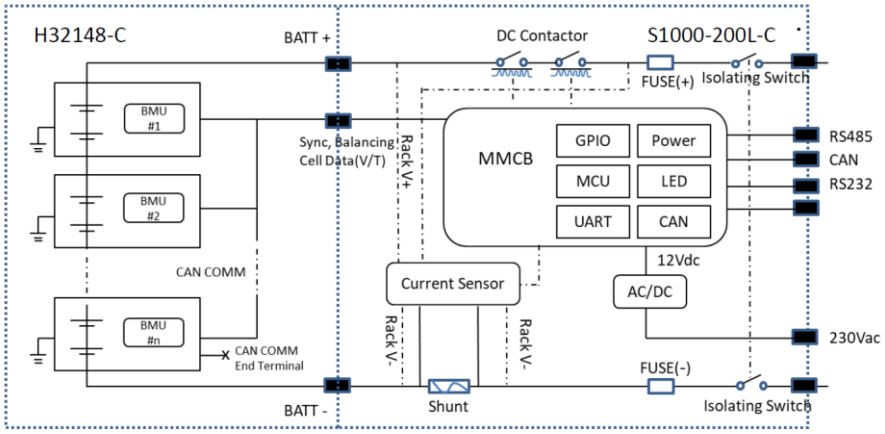
Test item particulars.....:	
Classification of installation and use.....:	☐ Ordinary Person ☐ Instructed Person ☒ Skilled Person
Supply Connection.....:	☐ pluggable equipment ☐ type A ☒ type B ☐ permanent connection ☐ detachable power supply cord ☐ non-detachable power supply cord
Recommend charging method of the battery system.....:	74A
Maximum specified discharge current of the battery system.....:	180A
Specified final voltage of the battery system.....:	Upper limit: 36Vd.c.× n (where n = 1~27 for external power supply, n= 8~27 for internal power supply) Lower limit: 27Vd.c.× n (where n = 1~27 for external power supply, n= 8~27 for internal power supply)
Upper limit charging voltage of the cell .....:	3.8Vd.c.
Lower limit discharging voltage of the cell.....:	2.5Vd.c.
Upper limit charging temperature of the cell .....:	62°C
Specified SOC (state of charge) for installation or maintenance of the battery system .....:	-
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing ..... :	
Date of receipt of test item..... :	
Date (s) of performance of tests ..... :	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☐ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ **Yes** ☐ **Not applicable**
When differences exist; they shall be identified in the General product information section.	

Name and address of factory (ies) .....:	Pylon Technologies Co., Ltd. Plant 8,No.505 Kunkai Road, JinXi Town, Kunshan City, Jiangsu Province, PEOPLE'S REPUBLICA OF CHINA

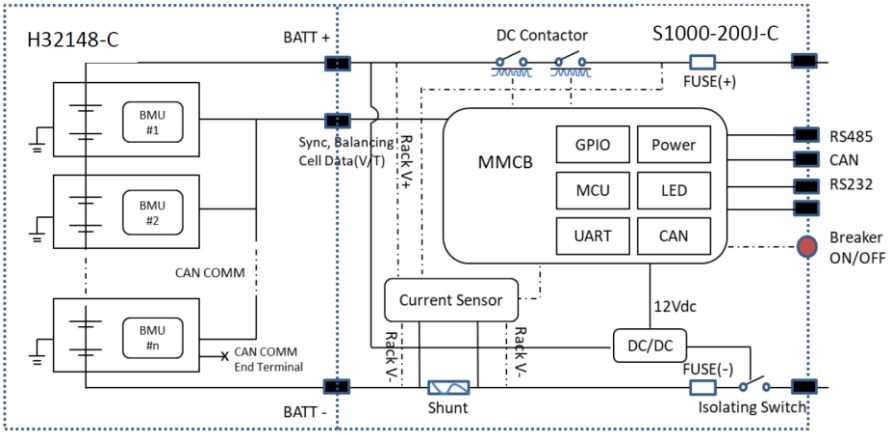
General product information and other remarks:

The EUTs covered by this report are energy storage systems which include one control module SC1000-200L-C and n (where n = 1~27) battery modules H32148-C in series connection or include one control module SC1000-200J-C and n (where n = 8~27) battery modules H32148-C in series connection.
The battery module is constructed with 2 small modules in series which are connected in the style that five cell blocks in series (4P5S) for each small module, and has overcharge, over-discharge, over current, over temperature and short-circuits proof circuit.
The control module is supplied by the AC circuit or energy storage system, and gets the information of cell voltage and temperature through the communication port. The electronic circuits and software controls for the battery system replied upon as the primary master BMU safety protection, which have been evaluated in accordance with IEC 60730-1 Annex H.
The EUTs are built-in type, and are only used in the restricted access area. The insulation between the DC circuit and the metal enclosure is basic insulation. And the insulation between the DC circuit and communication ports is reinforced insulation or double insulation.
The manual disconnect device for both battery circuit and AC power supply circuit shall be provided externally.
The system diagram block is as below: the control module is supplied by different power style for two.

For S1000-200L-C



For S1000-200J-C



Model list:

Product name	LFP Lithium Ion Energy Storage System	
Identification / Type No.	PowerCube-M1-C-32/zzzV-L10 (zzz=32~864, in steps of 32)	PowerCube-M1-C-32/zzzV-J10 (zzz=256~864, in steps of 32)
Battery controller	S1000-200L-C	S1000-200J-C
Manufacturer	Pylon Technologies Co., Ltd.	
Production Factory	Pylon Technologies Co., Ltd.	
System designation	IFpP/13/141/238/[(((4P)5S)2S)nS]M/0+55/95 (where n = 1~27)	
Rated capacity	148Ah	
Nominal voltage	32V × n (where n = 1~27)	32V × n (where n = 8~27)
Nominal charging voltage	36V × n (where n = 1~27)	36V × n (where n = 8~27)
Final voltage / End-of-discharge voltage	27V× n (where n = 1~27)	27V× n (where n = 8~27)
Recommend charging method declared by the manufacturer	At constant current 74A till voltage reaches 36V× n (where n = 1~27), then switch to constant voltage 36V× n (where n = 1~27), till charge current drops to 7.4A	At constant current 74A till voltage reaches 36V× n (where n = 8~27), then switch to constant voltage 36V× n (where n = 8~27), till charge current drops to 7.4A
Recommend discharging method declared by the manufacturer	Discharging with 74A constant current to discharge cut-off voltage 27V× n (where n = 1~27)	Discharging with 74A constant current to discharge cut-off voltage 27V× n (where n = 8~27)
Supply for controller	230Va.c./50Hz/1.5A	-
Nominal Current	29.6A	
Recommend Current	74A	
Maximum charging current	180A	
Maximum discharging current	180A	
Upper limit charging voltage	36V× n (where n = 1~27)	36V× n (where n = 8~27)
Operating temperature	Charging: -8 to 60°C, Discharging: -10 to 60°C	
Wh rating	4.736kWh × n (where n = 1~27)	4.736kWh × n (where n = 8~27)
Overcharge protected voltage supply by battery system	≥3.65V/Cell	
Temperature threshold for protection	61 °C	
IP rating	IP20	

Protective Class	I
Pollution degree (PD)	II
Cooling type	Natural cooling
Altitude [m]	4000m
External dimensions	815mm(W)*659mm(D)*2130mm(H) (Rack for n = 1~23) 815mm(W)*659mm(D)*2300mm(H) (Rack for n = 1~25) (n > 25, add a Rack)
Weight	Single Rack: 114+ 43xn (where n = 1~25) kg Doube Rack: 215+ 43xn (where n = 26~27) kg

4	PARAMETER MEASUREMENT TOLERANCES		
	Parameter measurement tolerances		P

5	GENERAL SAFETY CONSIDERATIONS		
5.1	**General**		**P**
	Battery systems and the cells comply with the applicable general safety considerations of IEC 62619.	Complied with IEC 62619	P
	Lithium-ion cells be operated within the operating region and the storage conditions.		P
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse . :		P
5.2	**Insulation and wiring**		**P**
	Voltage, current, altitude, and humidity requirements		P
	Adequate clearances and creepage distances between connectors in accordance with IEC 60950-1:2005, 3.1 and 3.2		P
	Hazardous live parts of the battery system be protected to avoid the risk of electric shocks, including during installation.	Build-in type	N/A
	Mechanical integrity of the battery system and connections follow the requirements from the end-use equipment manufacturer or Annex A.		P
	Maximum allowed number of series connections in the specification or instruction manual..... :		P
5.3	**The peak voltage of charging**		**P**
	Peak voltage of the alternating component of charging current is under the upper limit charging voltage, by monitoring the voltage of every single cell or cell block.		P
	Encapsulation used to support cells within an outer casing		P

6	TYPE TEST CONDITIONS		
6.1	**General**		**P**
6.2	**Test items**		**P**
	Cells or batteries that are not more than six months old (See Table 1 of IEC63056)	considered	P
	Capacity confirmation of the cells or batteries	considered	P
	Default ambient temperature of test, 25 °C ± 5 °C	considered	P

7	SPECIFIC REQUIREMENTS AND TESTS	
7.1	**Basic requirement**	**P**

	Cells and battery systems comply with the tests of IEC62619 in addition to the test requirements of this document.		P
7.2	**Resistance to abnormal heat**		**N/A**
	Non-metallic materials on which parts at HAZARDOUS VOLTAGE are directly mounted, resistant to abnormal heat.	No such part	N/A
	Ball pressure test according to IEC60695-10-2 at (ΔT + Tmax + 15 °C) ± 2 °C ..... :	See Table 7.2	N/A
7.3	**Casing material of a battery system that can be transported for installation or maintenance**		**N/A**
	Thermoplastic materials used for casing be of class V-2, V-1 or V-0	No such part	N/A
	Components mounted on V-1 CLASS MATERIAL and be separated from case material of V-2 CLASS MATERIAL by at least 13 mm of air, or by a solid barrier of V-1 CLASS MATERIAL..... :		N/A
	Materials be tested at a thickness equal to the smallest thickness used in the application and classified in accordance with IEC 60695-11-10... :	See Table 7.3	N/A
7.4	**Electric insulation check during transport and installation**		**P**
	Hazardous live parts be covered or insulated against contact with the personnel during transport and installation.		P
	Insulation resistance test in an ambient temperature of 25 °C ± 5 °C tested in accordance with IEC 62133:2017, 5.2.		P
	Ambient (°C); measured insulation resistance (MΩ); ≥ 5 MΩ.....:		P
7.5	**Charging procedures for test purposes**		**P**
	Prior to charging, the DUT have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage	considered	P
	Unless otherwise stated, the DUT is then charged in an ambient temperature of 25 °C ± 5 °C, using the method specified by the manufacturer.		P
7.6	**Protection against short circuit during transport and installation**		**P**
	A safeguard is provided by the battery system manufacturer to reduce the risk of short circuit for personnel at the time of electrical installation or transport.		P
	Where the battery pack is divided into parts for the purpose of transportation, protective safeguards shall be provided not only for the battery system, but also for each part.		P

	Short circuit the DUT with total external resistance of (30 mΩ ± 10 mΩ) × module configuration (= number of series connections / number of parallel connections) or less than 5 mΩ, whichever is higher, and less than 100 mΩ.		—
	Results: no rupture, no fire, no explosion.....:	See Table 7.6	P
7.7	**Protection for reverse connection**		**P**
	When a battery system has multiple battery packs or modules, the battery system shall remain in a safe condition at the time of installation, even if one of the battery packs or modules is connected with opposite polarity to the others.		P
	A DUT has a feature that prevents a reverse connection, or when modules or battery packs are connected in the battery system with the BMS at the factory, test is not required.		P
	Test the battery system with one module reverse connected.		—
	Results: no rupture, no fire, no explosion.....:	See Table 7.7	P
7.8	**Overdischarge control of voltage (battery system)**		**P**
	The BMS shall control the cell voltage during discharging above the lower limit discharging voltage of the cells.		P
	Monitor the cells voltage while overdischarge the battery system or part of system.		—
	Results: BMS interrupt the overdischarging current by an automatic disconnect of the main contactors:	See Table 7.8	P
7.9	**Drop test**		**P**
7.9.1	General		P
	This test is performed to simulate a drop during installation and maintenance		P
7.9.2	Whole drop test (for DUT ≤ 50kg)		P
	The DUT is dropped one time from a height shown in Table 2 onto a flat concrete or metal floor.		P
	Results: no fire, no explosion..... :	See Table 7.9	P
7.9.3	Edge and corner drop test (for DUT > 50kg)	≤ 50kg	N/A
	Test arrangements as shown in Figure 3, Figure 4 and Figure 5. The DUT is dropped two times from a height shown in Table 2 onto a flat concrete or metal floor, with reproducible impact points for the shortest edge drop impact and the corner impacted.		N/A
	Results: no fire, no explosion..... :	See Table 7.9	N/A

8	**INFORMATION FOR SAFETY**	

	Information for safety in accordance with IEC 62619		P

9	**MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)**		
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.		P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation	IFpP/13/141/238/[((4P5S)2S)nS]M/0+50/95	P
	Battery structure formulation		P

ANNEX A	**Wiring, connections and supply**		**P**
A.1	Summarizes wiring, connections and supply, as addressed in IEC 60950-1:2005.		P
3.1.1	Current rating and overcurrent protection		P
3.1.2	Protection against mechanical damage		P
3.1.3	Securing of internal wiring		P
3.1.4	Insulation of conductors		P
3.1.5	Beads and ceramic insulators	No such part	N/A
3.1.6	Screws for electrical contact pressure		P
3.1.7	Insulating materials in electrical connections		P
3.1.8	Self-tapping and spaced thread screws		P
3.1.9	Termination of conductors		P
	10 N pull test		P
3.1.10	Sleeving on wiring		P
3.2.1.2	Connection to a d.c. mains supply		P
3.2.5.2	DC power supply cords	No such part	N/A
3.2.6	Cord anchorages and strain relief	No such part	N/A
	Mass of equipment (kg), pull (N) ..... :		—
	Longitudinal displacement (mm) ..... :		—
3.2.7	Protection against mechanical damage		P
3.2.8	Cord guards	No such part	N/A
	Diameter or minor dimension D (mm); test mass (g) ..... :		—
	Radius of curvature of cord (mm)..... :		—
A.2	Summarizes wiring, connections and supply, as addressed in IEC 62368-1.		P
5.4	Isolation materials and requirements (including clearances and creepage distances)		P

G.7	Mains supply cords	No such part	N/A
G.7.1	General requirements		N/A
	Type..... :		—
G.7.2	Cross sectional area (mm^2 or AWG) ..... :		N/A
G.7.3	Cord anchorages and strain relief for non-detachable power supply cords		N/A
G.7.3.2	Cord strain relief		N/A
G.7.3.2.1	Requirements		N/A
	Strain relief test force (N)..... :		N/A
G.7.3.2.2	Strain relief mechanism failure		N/A
G.7.3.2.3	Cord sheath or jacket position, distance (mm) .... :		N/A
G.7.3.2.4	Strain relief and cord anchorage material		N/A
G.7.4	Cord Entry		N/A
G.7.5	Non-detachable cord bend protection		N/A
G.7.5.1	Requirements		N/A
G.7.5.2	Test method and compliance		N/A
	Overall diameter or minor overall dimension, D (mm) ..... :		—
	Radius of curvature after test (mm) ..... :		—
G.7.6	Supply wiring space		P
G.7.6.1	General requirements		P
G.7.6.2	Stranded wire		P
G.7.6.2.1	Requirements		P
G.7.6.2.2	Test with 8 mm strand		P

7.2	**TABLE: Resistance to abnormal heat (ball pressure test）**		**N/A**
	Upper limit ambient temperature Tmax of the battery system specified by the battery system manufacturer..... :		—
	Maximum temperature rise ΔT of thermoplastic parts during the most adverse operation at 25 ℃ ± 5 °C specified by the battery system manufacturer..... :		—
	Allowed impression diameter (mm) ..... :	≤ 2 mm	—
Part		**Test temperature (°C)**	**Impression diameter (mm)**

Supplementary information:

7.3	TABLE: Casing material of a battery system that can be transported for installation or maintenance				N/A
Part	**Manufacturer of material**	**Type of material**	**Thickness (mm)**	**Flammability class**	**Evidence**
Supplementary information:					

7.4	TABLE: Electric insulation check during transport and installation		P
Part	**Test voltage (V)**	**Insulation resistance (Ω)**	**Limit (Ω)**
Battery+ to PE	500Vd.c.	17.07G	5M
Battery- to PE	500Vd.c.	17.86G	5M
Battery circuit to communication circuit	500Vd.c.	14.58G	5M
Supplementary information:			

7.6	TABLE: Protection against short circuit during transport and installation					P
DUT	**Ambient (25°C ± 5°C)**	**OCV at start of test (V dc)**	**Resistance of Circuit (mΩ)**	**Maximum Case Temperature Rise ΔT (°C)**	**Test termination**	**Results**
Battery system	25	907.3	4.36	-	The DUT protected	C, F

Supplementary information:
Test termination:
A - The test was completed after 6 h;
B - The test was completed after the cell casing cooled to 20% of the maximum temperature rise
Results:
C - No fire or Explosion;
D - Fire;
E - Explosion;
F - Other (Please explain): Protected by the overcurrent device.

7.7	TABLE: Protection for reverse connection				P
Battery system	**Ambient (25°C ± 5°C)**	**SOC for installation or maintenance**	**Reverse connection of a module**		**Results**
			Charge the battery system	**Discharge the battery system**	
PowerCube-M1-C-32/160V-L10	25	98%	-	√	B,C
PowerCube-M1-C-32/160V-L10	25	98%	√	-	B,C

Supplementary information:
Charge / Discharge the battery system:
A - Fully charged or discharged.
B – Charging or discharging is stopped by a safety protection.
Results:
C - No fire or Explosion;
D - Fire;
E - Explosion;
F - Other (Please explain):___

7.8	TABLE: Overdischarge control of voltage (battery system)					P
DUT	Ambient (25°C ± 5°C)	OCV at start of test (V dc)	Discharge current		Measured minimum cell voltage (V)	Results
			0.2 It (A)	Maximum discharge current (A)		
PowerCube-M1-C-32/32V-L10	25	33. 463	29.6	180	2.698	A

Supplementary information:

See page 5 “Test item particulars” for the lower limit discharging voltage of the cell

DUT:

Battery system or Part of battery system

Results:

A - The BMS interrupt the over discharging current by an automatic disconnect of the main contactors before the cell voltage dropped below lower limit discharging voltage of the cell.

B - Measured minimum cell voltage less than lower limit discharging voltage of the cell.

7.9	TABLE: Drop test			P
DUT	Mass of the test unit (kg)	Height of drop (m)	OCV at start of test (V dc)	Results
Cell	-	-	-	-
Module	43	0.5	30.02	A
Battery system	-	-	-	-

Supplementary information:

DUT:

Cell, Module or Battery system

Results:

A - No fire or Explosion;

B - Fire;

C - Explosion;

D - Other (Please explain):___

The end